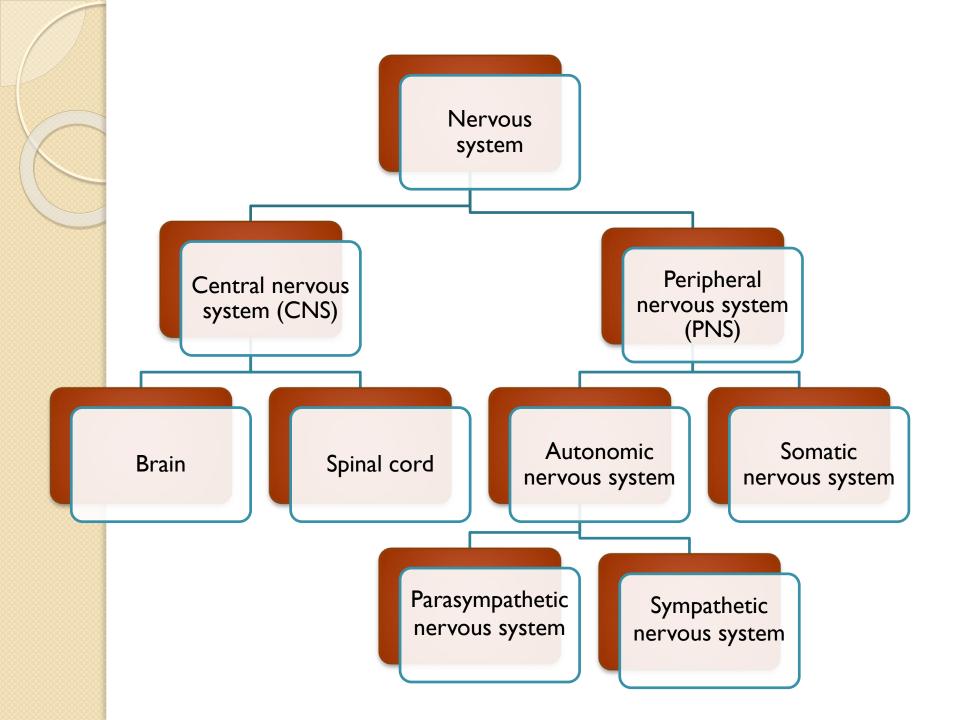
# ORGANIZATION OF NERVOUS SYSTEM: Structure and functions of CNS

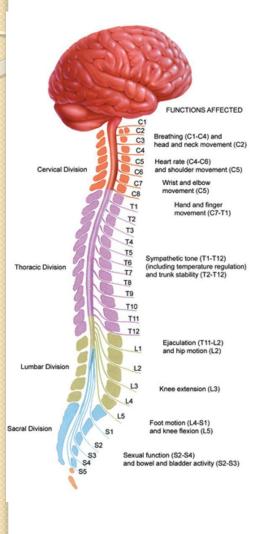
By: Dr. Nupur Sinha Assistant Professor Patna Women's College, Patna University 2018



# **Central Nervous System**

- Brain
- Spinal cord
- Protective coverings of the Brain and Spinal Cord: outer and inner covering. Outer covering consists of the cranial bones; inner coverings consist of the meninges (dura mater, arachnoid membrane, and pia mater).
- Cerebrospinal fluid

# Spinal Cord

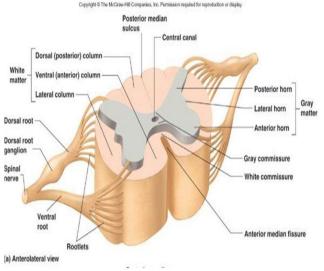


- Like a long stalk protruding from the fore brain
- Transmits messages from sensory receptors to the motor receptors

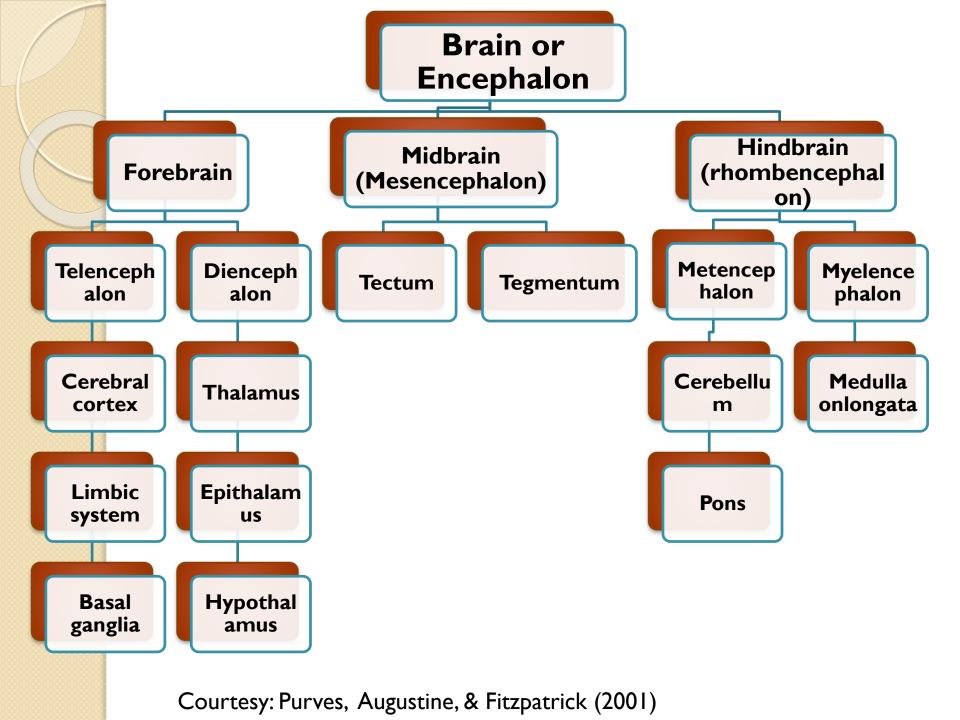
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#### Cross Section of Spinal Cord

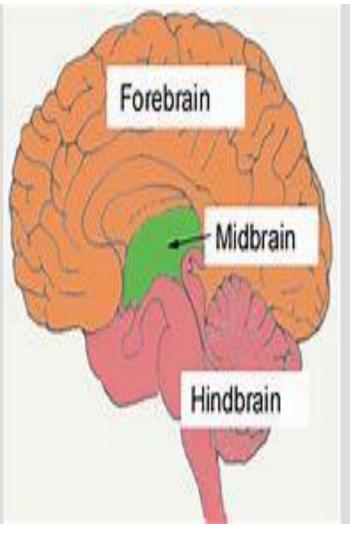


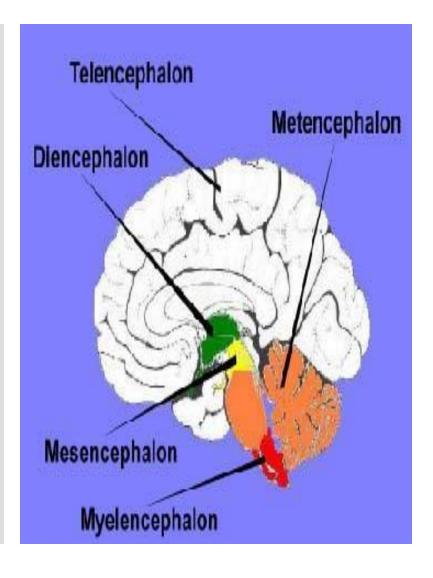
- There is an H-shaped gray matter at the centre of the cord.
- Also capable of some local functioning, involves sensory neurons, motor neurons, and sometimes interneurons





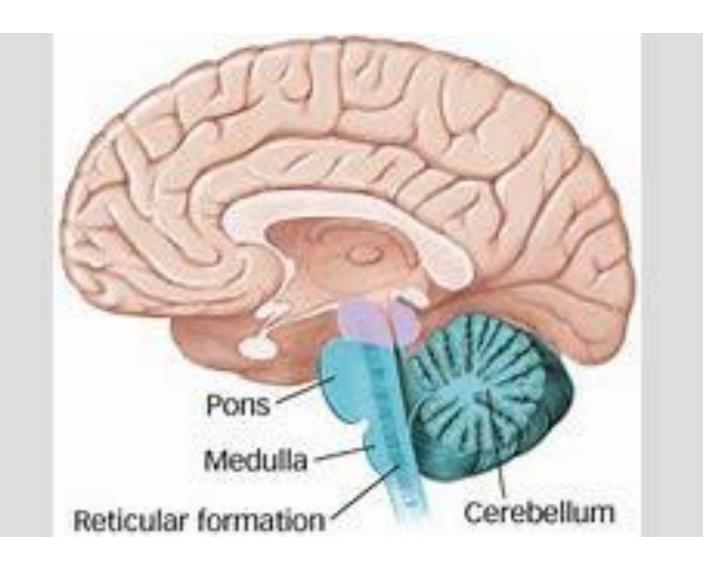
# Brain







# Hind brain



#### • MEDULLA:

- First large swelling at the top of the spinal cord
- Responsible for functions such as breathing, swallowing, heart rate
- Nerves coming from and going to left and right sides of the body cross over

#### continued...

#### • CEREBELLUM :

- Meaning "little brain"
- Associated with regulation and coordination of movement, posture and balance
- Involved in helping make our bodily movements precise, coordinated, and smooth



### • PONS:

- Larger "swelling" just above the medulla
- Meaning "bridge"
- Influences consciousness (sleep and dreaming), coordination of movement, posture, arousal

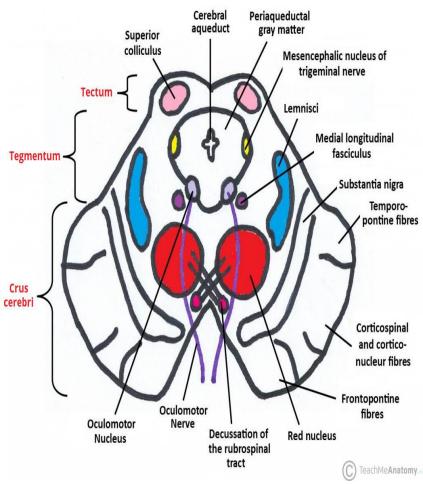
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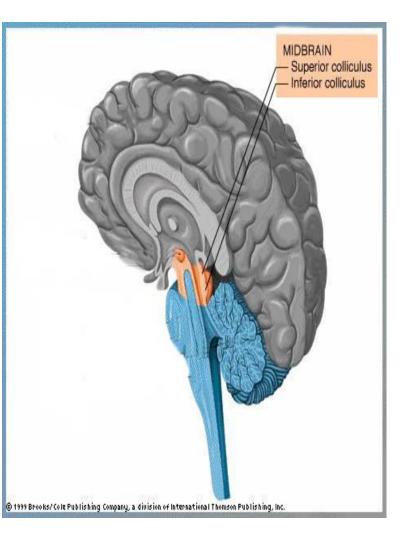
#### • RETICULAR FORMATION:

- Runs from the medulla to the midbrain
- Contains many small clumps of neurons and a number of long and short nerve fibres
- Ascending reticular formation: involved in the regulation of arousal, sleep-wake cycle
- Descending reticular formation: involved in posture and equilibrium



# Midbrain





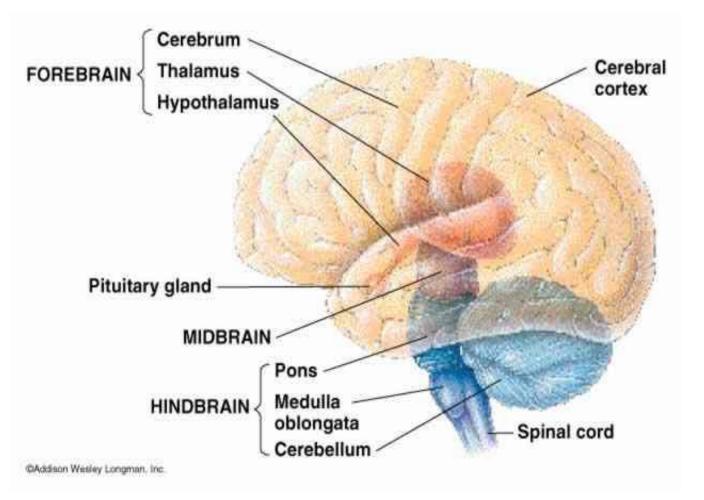


# MidBrain

- Rostral part of the brain stem
- Consists of tectum and tegmentum
- Involved in functions such as vision, hearing, eye movement and body movement.



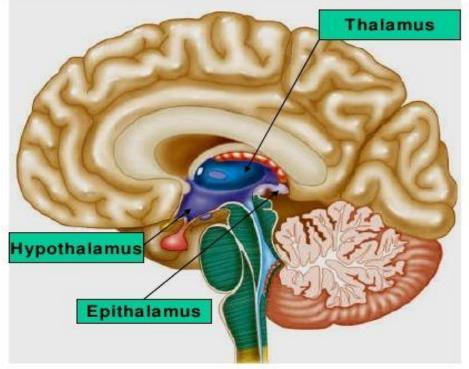
### Forebrain



# Forebrain (Diencephalon)

### The Diencephalon

- The diencephalon consists of three structures
  - Thalamus
  - Hypothalamus
  - Epithalamus
- These structures effectively enclose the third ventricle





#### • THALAMUS

- Meaning "bedroom"
- Lies between the two cerebral hemispheres
- Relays and processes sensory information on its way to the cerebrum
- 2 divisions: ventral and dorsal
- 3 kinds of nuclei

#### continued...



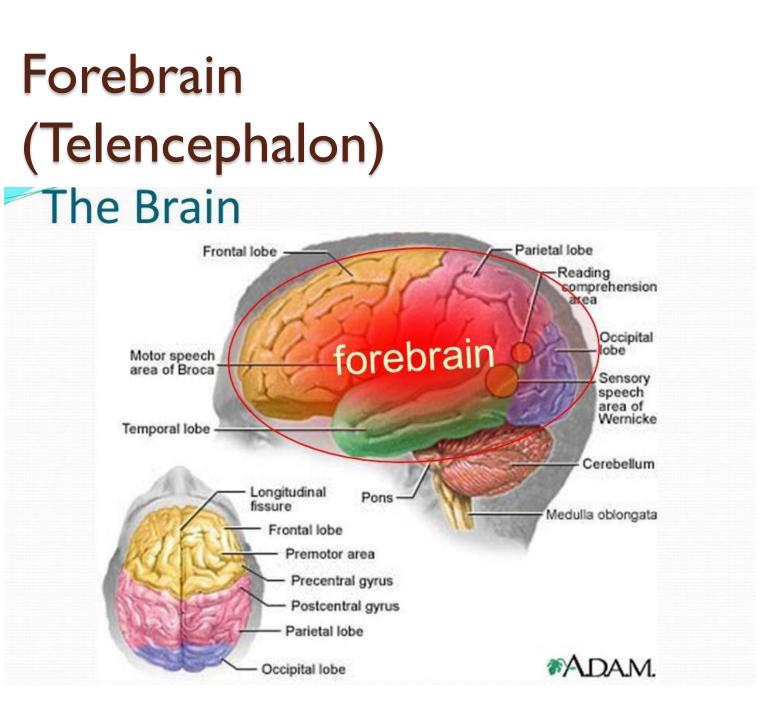
### • HYPOTH&L&MUS

- Meaning "under the thalamus"
- Involved in hunger, thirst, regulation of the internal body environment
- Receives and sends information to and from higher cortical centres
- Plays a role in terms of: fighting, feeding, fleeing, and mating



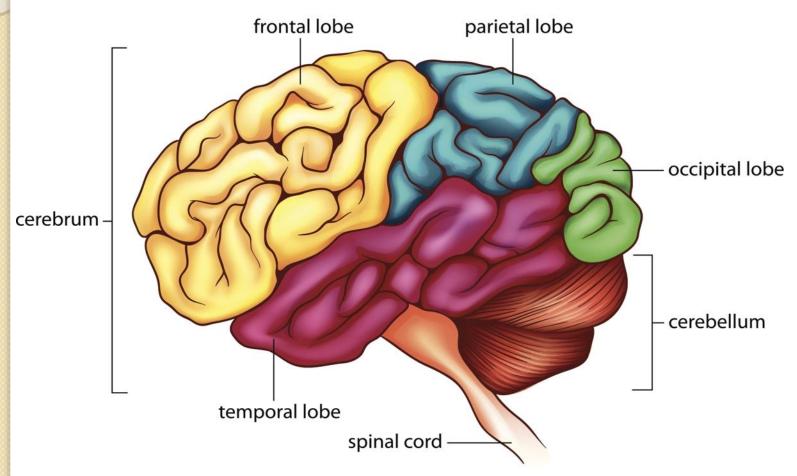
#### • EPITHALAMUS

- Meaning "upper room"
- Consists of pineal gland and posterior commissure
- Pineal gland releases the hormone 'melatonin'



#### • CEREBRUM

#### **Human Brain Anatomy**

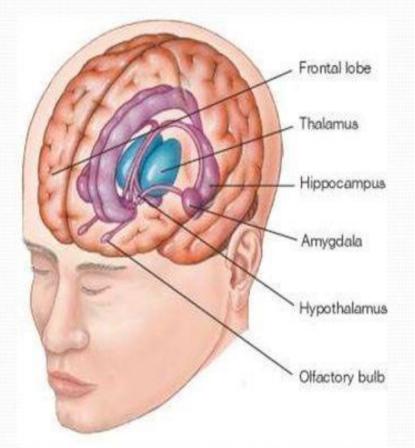


### • CEREBRUM

- Consists of cerebral hemispheres
- Cerebral cortex: covering each hemisphere is a thin, folded sheet of neurons
- Sulci: grooves in the cerebral cortex; Gyrus: the ridges
- Four lobes: frontal, parietal, temporal, and occipital
- Functions: sensory areas, motor areas, and association areas

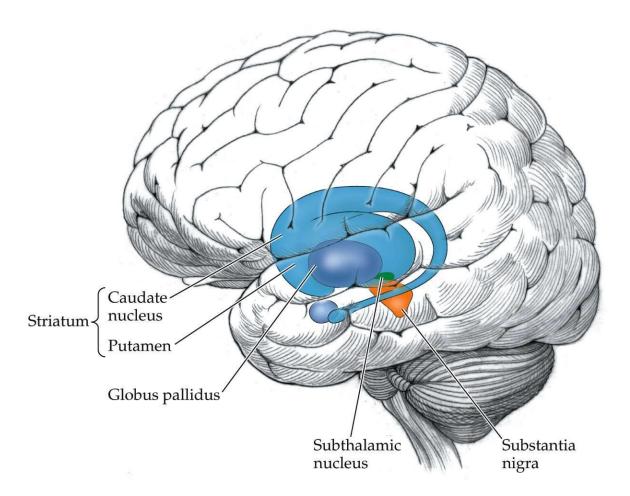
# **LIMBIC SYSTEM**

- <u>HIPPOCAMPUS</u> plays an important role in emotion, learning and memory.
- <u>AMYGDALA</u> plays role in aggression, eating, drinkin g and sexual behaviors.
- <u>HYPOTHALAMUS</u> monitors blood levels of glucose, salt, blood pressure and hormones.





# Basal ganglia



# Basal ganglia

- Functions of basal ganglia:
- Planning and execution of movement, orienting movements, autonomic functions.



# References

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